MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

ETM7146 - SWITCH & NETWORKING TECH & SYS

8 MARCH 2018
2:00 P.M- 5:00 P.M.
(3 Hours)

INSTRUCTION TO STUDENT

1.This Question paper consists of 7 pages including cover page with 4 Questions only.

2. Attempt all **FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please print all your answers in the answer Booklet provided.

Question 1

(a) Differentiate between blocking and non-blocking in circuit switching.

[3 marks]

(b) Design a three-stage space division switch which consists of 3 type of switches which are 5×2, 2×2 and 2×5 for number of inlet, n=10 and number of outlet, m=10. Given that the 2x2 switch will be used at the central stage.

[7 marks]

(c) During the peak hour in a day, 1800 calls were offered to a group of trunks and 9 calls were lost. The average call duration was 2 minutes. Determine the following:

(i) The traffic offered.

[1 mark]

(ii) The traffic carried.

[1 mark]

(iii) The traffic lost.

[1 mark]

(iv) The grade of service.

[1 mark]

(v) The duration of the congestion.

[1 mark]

(d) Grading is a technique commonly used to reduce costs of individual switches for telecommunications switching systems.

(i) How does mixing from two diverse traffic groups improve the performance of grading systems?

[5 marks]

(ii) Design a grading system with twenty trunks on the input and availability of twelve for a two groups grading system.

[5 marks]

Continued...

Question 2

(a) Draw circuits to distinguish between in-channel signaling and common channel signaling which involve end office (end station), per trunk signal element (SIG) and CCIS (common channel interoffice signaling equipment).

[3 marks]

(b) Signaling System No. 7 (SS7) is using common channel signaling.

(i) Critically discuss the advantage(s) and disadvantage(s) of common channel signaling.

[4 marks]

(ii) Identify either associated mode or disassociated mode is the best implementation if the adopted organization is small and has limited funding.

[3 marks]

(iii) Why there are need to have separate application entity in SS7 protocol suite as being defined in Telephone User Part (TUP), Integrated Services Digital Network User Part (ISUP) and Broadband ISDN User Part (BISUP)?

[3 marks]

(c) (i) Say a network protocol layer would like to change from using Internet Protocol version 4 (IPv4) to Internet Protocol version 6 (IPv6). Discuss changes that need to be made to support this implementation for that layer and the other layers. Discuss your reasoning.

[6 marks]

(ii) Internet Protocol Multimedia Subsystem (IMS) architecture had been proposed to support multiple access and multimedia communication. How does the IMS architecture differ from Open System Interconnection (OSI) reference model?

[6 marks]

Continued...

Question 3

(a) An Internet Protocol Version 4 (IPv4) datagram has arrived with the following information in the header (in hexadecimal): 0x45 00 00 54 00 03 00 00 20 06 00 00 7C 4E 03 02 B4 0E 0F 02. Given the checksum is 0x0000. Answer the following;

(i) Is the packet header corrupted?

[1 mark]

(ii) Are there any options information included?

[1 mark]

(iii) What is the size of data?

[1 mark]

(iv) What is the identification number of packet?

[1 mark]

(v) Is the packet fragmented?

[2 mark]

(vi) How many more routers can the packet travel to?

[2 mark]

(b) Routing protocols in the Internet can be classified into intra-domain or inter-domain routing protocols.

(i) Give an example for each of the two classes.

[1 mark]

(ii) Discuss why we need these two classes of routing protocols.

[6 marks]

Continued...

(c) Figure Q3 shows a weighted digraph with six nodes (labelled V_1 to V_6) and each link is associated with a cost. Using Dijkstra's algorithm, generate a least-cost path to all other nodes from node V_6 for the network in Figure Q3 by filling up a Table Q3.

[10 marks]

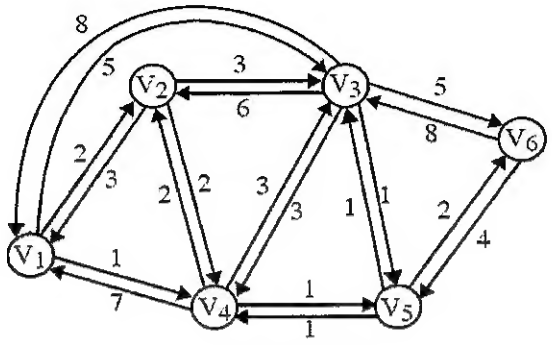

Figure Q3

Table Q3

M	L(1) Path	L(2) Path	L(3) Path	L(4) Path	L(5) Path
1					
2					
3					
4					
5					
6					

Continued...

Question 4

(a) Figure Q4(a) shows a network configuration involving two routers. Provide routing tables based on route and next hop for Host A, router R1 and router R2.

[6 marks]

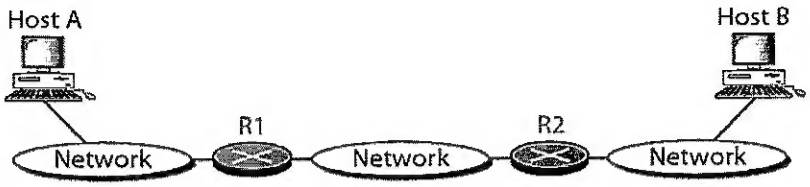

Figure Q4(a)

(b) Figure 4(b) shows flows of traversing a Multiprotocol Label Switching (MPLS) network. Each router has interfaces labeled 1,2,3. Complete the forwarding tables for routers R1,R2 and R3 based on label distribution.

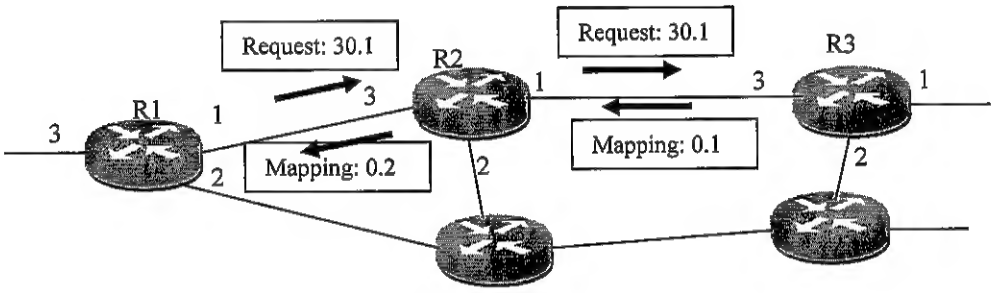

Figure 4(b)

[6 marks]

Continued...

(c) In transport control protocol (TCP) flow control, assume that host A is to transfer an enormous file of L bytes to host B. In order to reduce the traffic, the allowable maximum segment size (MSS) used is 300 bytes. Assume there are 2^{10} possible sequence numbers. There are total of 50 bytes of transport, network and data-link headers are added to each segment before the resulting packet is transmitted. Further assume that TCP flow control and congestion control are not disabled so that host A can send out the segments back-to-back and continuously. Determine;

(i) Number of segments transferred from host A to host B.

[2 marks]

(ii) Total length of header.

[2 marks]

(iii) Total number of bytes transmitted.

[2 marks]

(d) Figure 4(d) shows a sliding window. We assume that receiver window (rwnd) is 33. The receiver has sent an acknowledgment number of 102 with a congestion window (cwnd) of 18 bytes.

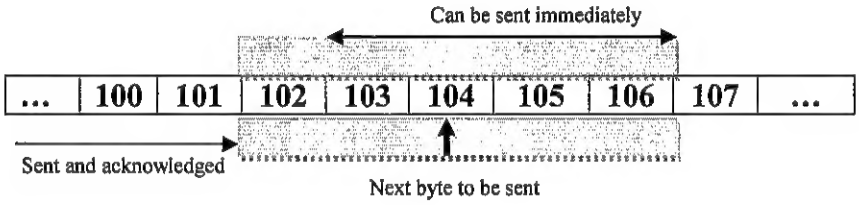

Fig. 4(d)

Determine each of the following;

(i) Size of the sender window both rwnd and cwnd

[2 marks]

(ii) Bytes that are sent, but not acknowledged.

[2 marks]

(e) List THREE (3) parameters involved in network design to determine network performance for Multimedia University campus.

[3 marks]

End of Paper